"underbuilt" beneath the 345-kV transmission lines, thus requiring the height of the proposed 345-kV structures to increase at least 30 ft (9.2 m), resulting in increased impacts to the viewshed. Combining different transmission lines onto a single set of support structures would mean that a problem with one structure would affect multiple transmission lines, thus potentially decreasing electrical reliability.

2.1.5 No Action Alternative

CEQ regulations require that an agency "include the alternative of no action" as one of the alternatives it considers (40 CFR 1502.14[d]). In the context of this EIS, "no action" means that TEP's proposed transmission line is not built. For DOE and the cooperating agencies, "no action" would be achieved by any one of the Federal agencies declining to grant TEP its permission to build in its respective jurisdiction. Thus, in the case of DOE, "no action" means denying the Presidential Permit; for USFS, "no action" means denying the special use permit; and, for BLM, "no action" means denying access to BLM-managed Federal lands. Each agency makes its own decision independently, so that it is possible that one or more agencies could grant permission for the proposal while another could deny permission. Thus, if any agency denied permission for the proposed transmission line, it would not be built. It may be possible that a transmission line would be built on private land and would not cross the U.S.-Mexico border. In that event, no approval by any Federal agency would be required.

2.2 CONSTRUCTION AND MITIGATION ACTIVITIES COMMON TO ALL ALTERNATIVES

2.2.1 Substation Upgrades and Additions and Fiber-Optic Regeneration Site

The expansion of the existing TEP South Substation, and construction of the Gateway Substation and fiber-optic regeneration site, would be the same for each proposed corridor. The South Substation in Sahuarita (see Figure 1.1–4) would be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation would be expanded by an estimated 1.3 acres (0.53 ha) to add a switching device that would connect to the proposed transmission line by moving the fenceline 100-ft (30-m) to the east.

The new Gateway Substation (see Figure 1.1–4) would include a 345-kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation would be constructed within a developed industrial park north of Mariposa Road (State Route 189), an estimated 0.5 mi (0.8 km) east of the Coronado National Forest boundary (Northeast ¼ Section 12, Township 24 South, Range 13 East). The TEP portion of the site (the area that would be graded) is an estimated 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed.

Preparation of the new substation and substation expansion would require the following:

- Cut-and-fill grading to level the construction area to a smooth surface using existing soil
- Placement and compaction of soil brought in from offsite, as needed, to serve as a foundation for equipment
- Subsurface grounding grids (buried system of conductors to provide safety for workers)
- Grading to maintain drainage patterns
- Oil spill containment facilities
- Gravel-covered parking areas approximately 20 by 40 ft (6 by 12 m)
- Fences and gates

- Revegetation with native plants, leaving a 10-ft (3-m) clear zone around the outside perimeter of the fence for safety and security personnel
- Erosion control, such as placement of gravel within the fenced area

The maximum height of structures in the substations would be approximately 100 ft (30 m). The substation yard would be open-air and would include transformers, circuit breakers, disconnect switches, lightning/surge arresters, reactors (for voltage regulation), capacitors, bus (conductor) structures, and a microwave antenna. Each substation would have a new switchyard control shelter that would be a structure approximately 40 ft (12 m) wide by 60 ft (18 m) long, and approximately 20 ft (6 m) high, and it would be constructed of prefabricated material. Substation facilities would be enclosed by a chain-link fence with a locking gate with night lighting for security that would be shielded to prevent light from spilling offsite.

The substations would be designed and constructed to prevent and control accidental spills from affecting adjacent land uses and from reaching any waterbodies or courses in the vicinity of the switchyard. Containment structures would be constructed at the base of oil-filled equipment to contain spills. If a large volume of oil were to leak from a piece of electrical equipment, an alarm or a failure would occur notifying the operations center of the problem and a trained maintenance crew would be dispatched to the substation immediately to begin repairs and cleanup. Oil Spill Contingency plans and/or Spill Prevention Countermeasure and Control plans would be updated for the expansion of the existing substation. These plans explain clean-up and emergency notification procedures specific to each substation.

The ground level of the substation yard would be graded to direct the flow of water runoff. The yard would be covered with a layer of gravel (4 in [10 cm] or more thick) that would help inhibit erosion from stormwater runoff and discourage vegetation growth in the substation. Berms, or other barriers, also would be used around the perimeter of the yard (along the fence-line) to control runoff. Where needed, stormwater mitigation measures, such as retention ponds would be designed and constructed to contain runoff.

One fiber-optic regeneration site would be required. The precise location of this facility has not been determined. However, it would likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km) southwest of Sahuarita on private land. The fiber-optic regeneration site would consist of an estimated 0.5-acre (0.2-ha) fenced yard, containing a 10 by 20 ft (3 by 6 m) concrete pad with an equipment house. The cleared area for the equipment house would be approximately 20 by 30 ft (6 by 9 m).

2.2.2 Transmission Line Structures and Wires

The proposed project would utilize primarily self-weathering steel single pole structures (monopoles), depicted in Figure 1.1–1. Dulled, galvanized steel lattice tower structures, depicted in Figure 1.1–2, would be used in specified locations for engineering reasons or to minimize overall environmental impacts (for example, impacts to soils or potential archaeological sites), as explained in Section 2.2.3 (ACC 2002). Monopoles occupy less acreage at the foundation than lattice towers, and monopoles generally allow a narrower ROW. The typical span between lattice tower structures is 1,000 to 1,200 ft (305 to 365 m), compared to 800 to 900 ft (244 to 274 m) between single pole structures, thus requiring fewer lattice tower structures to support a given distance of transmission line route. However, the overall height and breadth of the lattice towers would be greater for increased span lengths. For the proposed project, the distance between transmission line structures would be between 600 and 1,200 ft (183 and 365 m). Three slight variations of the monopole (the tangent structure, the turning structure, and the deadend structure) that are visually very similar to the monopole in Figure 1.1–1 would be used at various points along the route based on the turning angle of the transmission line and the elevation change between towers.

Likewise, a slight variation of the lattice tower structure (the turning structure) that is visually similar to Figure 1.1–2, would be used at various points along the route. The final footprint of each monopole is approximately 25 ft^2 (2.3 m^2) the final footprint of each lattice tower structure is approximately 3,600 ft^2 (334 m^2).

The monopoles would be a low reflectance steel material that self-weathers (oxidizes, or rusts) to form a protective surface coating resulting in a color similar to wooden utility poles. The lattice structures would be steel with a galvanized, dulled finish. Self-weathering monopoles require very little ongoing maintenance following construction, aside from initial inspections to ensure that all joints and surfaces are weathering properly. Self-weathering steel is not an option for lattice towers, as the joints on lattice towers could collect moisture that would interfere with the protective coating that prevents corrosion. Galvanized or painted finishes can be used on lattice towers to darken and reduce shine, but the galvanizing process shortens the life of the finish and painted towers require more access for ongoing maintenance. (Refer to Section 4.2 for a complete discussion of visual impacts and pole treatment options.)

The double-circuit structures would support two 345-kV, three-phase lines. Each circuit of a double-circuit transmission line consists of three phases; each phase consists of two sub-conductors (for a total of twelve transmission line wires). The circuits are each thermally capable of supplying 1,000 megawatts (MW), but the double circuit would be operated to transmit a total of 500 MW for operational and reliability considerations.

Under normal circumstances each circuit would carry 250 MW, but in an emergency situation where one circuit is out of service, the remaining circuit could carry the full 500 MW. Operation in this manner is in accordance with Western Electric Coordinating Council's reliability guidelines (WECC 2003). (The Western Electric Coordinating Council is one of ten electric reliability councils in North America composed of electric utilities that promote a reliable electric power system.)

The single pole structures would be approximately 140 ft (43 m) tall with four arms on each side approximately 28 ft (8.5 m) apart to support the conductors and the neutral ground wire. Lattice tower structures would be approximately 140 ft (43 m) tall and would have four arms extending on either side. The minimum height of the conductor above the existing grade would be 32 ft (9.8 m) for all outside temperature conditions. The neutral ground wire that provides for lightning protection and fiber-optic communications would be supported on the smaller of the four arms above the conductor arms. The proposed fiber-optic ground wires would contain at least 48 fibers each. Splicing sites would be required at certain points along the corridor (to be determined during final project design), and splicing boxes would be attached to the transmission line structures (TEP 2003).

2.2.3 Transmission Line Construction

Construction of the proposed transmission lines would include the following roughly sequential major activities performed by small crews progressing along the length of line:

- Surveying
- Staging area development
- Structure site clearing/access way establishment
- Foundation excavation
- Construction of tower base
- Structure assembly/erection

- Conductor stringing/tensioning
- ROW cleanup and restoration

The approximate number of personnel and type of equipment required for construction of the transmission lines are shown in Table 2.2–1. Figure 2.2–1 depicts some of the equipment required during construction. TEP anticipates an average construction workforce of 30 individuals, with peak workforce levels reaching 50 individuals for short periods of time. The project would be completed approximately 12 to 18 months after construction begins.

Table 2.2–1. Typical Personnel and Equipment for Transmission Line Construction.

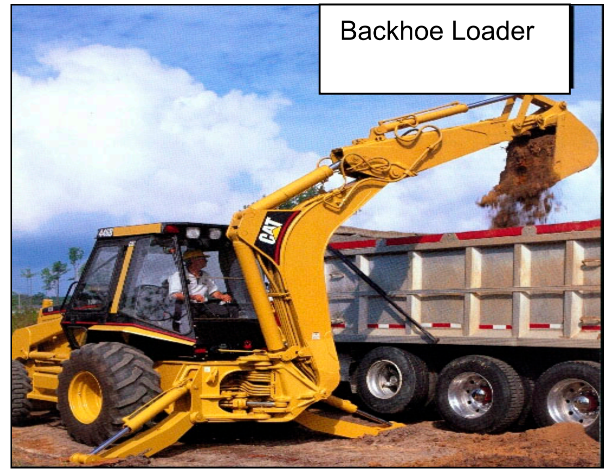
Activity	No. of Persons	Equipment
Clearing and grubbing	23	Flatbed truck, crawler bulldozer, jeep with auger, backhoe, side boom crane, equipment trailer, water spray truck
Foundation excavation/ construction	21	Flatbed truck, digger truck, loader, track air drill, tractor trailer, side boom crane, rough terrain crane, concrete truck
Structure erection	28	All terrain crane, tractor trailer, boom truck, concrete ready-mix truck, crew cab truck, line truck (bin body), lace boom crane
Conductor stringing	37	Crew cab flatbed, wire puller (truck mounted), crawler dozer, splicing buggy, wire tensioner (truck mounted), tractor and tandem axle reel trailer, pilot wire stringing truck, tractor trailer, truck mounted crane, aerial lift
Cleanup and road closures	9	Flatbed truck, crawler bulldozer, farm tractor with disc harrow

Source: TEP 2001.

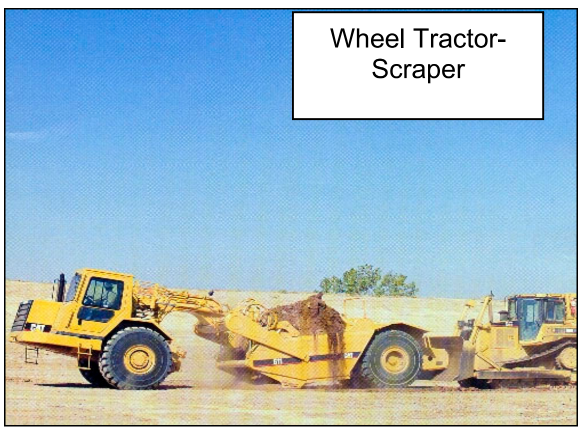
ROW Access. Access to the selected ROW for construction, operation, and maintenance of the proposed transmission lines would be on existing utility maintenance roads, ranch access roads and trails, and, where no access currently exists, new access ways. Construction access ways would be approximately 12 ft (3.7 m) wide to provide safe workspace for vehicle and construction equipment movement. Construction vehicle access would be along local roads, then along existing and new access roads as described in Sections 3.12 and 4.12. Siting of access roads would be coordinated with the affected property owners, USFS, U.S. Section of the International Boundary and Water Commission (USIBWC), and BLM to establish the most appropriate access to the structure sites. The Roads Analysis (RA) (URS 2003a) for the proposed project reflects TEP's consultations with USFS for siting and closing roads, including the criteria used by TEP to site proposed roads (see Section 4.13, Transportation). Practices to prevent the introduction or spread of invasive species (nonnative species transferred by human activity) would be established and followed in coordination with state and Federal agencies. Once access routes are selected, the vegetation within the access way would be removed, and vegetation along the edge of the access way would be pruned back to reduce damage during construction operations. Where the slopes are within appropriate limits for the safe operation of the construction equipment, no ground leveling would be done, in order to preserve the natural landform to near pre-construction conditions. Explosives blasting may be used as needed based on local geologic conditions.

Access by heavy construction equipment would be required to the site of each new structure. In the most sensitive or difficult terrain conditions, the access by construction workers may be by foot, and the materials and heavy equipment may be inserted by helicopter. Survey work would locate the transmission centerline, determine accurate profiles along the centerlines, and determine the exact location and rough profiles of access roads.

Water Truck



Backhoe Loader



Wheel Tractor Scraper

Dump Truck

Figure 2.2–1. Proposed Construction Equipment.

Excavator

Crane

Loader

Wheel Bulldozer

Figure 2.2–1. Proposed Construction Equipment (*continued*).

ROW and Structure Site Clearing and Grading. Preparation of the ROW would vary with ground cover and slope. In areas with a gentle slope and low vegetative cover, vegetation would be pruned to ground level. This method would keep the roots intact and maximize the restoration potential for areas not needed for ongoing maintenance access. This pruning would occur where such vegetation falls within the boundaries of a proposed access way. Cacti would be transplanted or held in designated holding areas along the edges of the access way for later use in revegetation. In areas with uneven terrain, construction crews would blade the ROW as necessary to ensure safe working conditions. All rocks and cut vegetation would be temporarily stockpiled along the ROW edges. This method of limiting the complete removal of vegetation improves the success of reclamation, increases habitat preservation, and decreases the potential for erosion.

The placement or scattering of the collected vegetative debris to create habitat or reduce surface erosion would be instituted where the collected vegetative debris would not be considered a potential fire danger. The areas near structure sites would be prepared by the “mobilization and environmental site preparation team” and delineated by flagging or degradable paint where appropriate.

Construction Yard and Material Handling Sites. Construction materials would be hauled to the construction yards from the local highways and then transported to structure sites using the methods previously described under ROW and Structure Site Cleaning and Grading. At each new structure site, an area would be disturbed by the movement of vehicles, assembly of structure elements, and other operations. The estimated area required for each monopole during construction is a 100 ft (30 m) radius circle, and each lattice tower would require an estimated 200 by 400 ft (61 by 122 m) area, more than twice the construction area required for monopoles.

Three temporary construction yards of no more than 3.0 acres (1.2 ha) each, and one temporary construction lay down yard of no more than 80 acres (32 ha) would be required. For each proposed corridor, the 3-acre (1.2-ha) yards would be located at the Gateway and South Substation sites, and near the Arivaca Road exit from I-19 in Amado. The 80-acre (32-ha) temporary construction lay down yard would also be located near the Arivaca Road/I-19 interchange in Amado. No construction yards would be located on national forest lands or lands managed by BLM. Temporary construction yards would serve as reporting locations for workers, parking space for vehicles, and storage for equipment and materials.

Foundation Excavation and Installation. The pole foundation would depend on the local geologic conditions. In areas of relatively intact bedrock near the ground surface, the poles would be supported on a rock bolted base, in which small holes (less than 6 in [15 cm] in diameter) are drilled into the bedrock and the tower is attached with large bolts. Areas with significant soil horizons would require direct embedment poles. This type of pole installation requires excavation of a shaft wider than the pole using a caisson-drilling rig, and then subsequent backfilling around the pole. In soils with large cobbles (rocks) or soils that tend to collapse, a large pit would be excavated and the pole would be placed in the pit. In such cases, a lean-concrete slurry may be required for backfill of the pit because soils with large cobbles are difficult to compact adequately (Terracon 2002). In extremely sandy areas, water or a gelling agent could be used to stabilize the soil before excavation.

Explosives blasting may be used in any of the three proposed corridors (including portions of each on the Coronado National Forest) as needed depending on geologic conditions. Typically, the depth to which a charge would be placed is approximately 3 ft (0.9 m) below ground level. The charge is limited to fracturing rock in a very localized area. Discharge of material is limited by proper charge design and use of blasting mats, which TEP would place over the excavation to further limit material and dust dispersion. Once the fractured material is removed from the excavation, an additional 3 ft (0.9 m) would be drilled, charged, and blasted. This process would be continued until the desired depth is attained.

Spoil material (excavated soil) would be used for fill where suitable and the remainder would be spread at the tower site. Foundation excavation and installation may require a power auger or drill, crane, material truck, and ready-mix concrete trucks.

Structure Assembly/Erection. Erection crews would assemble the structures and, using a large crane, position them in foundation excavations or set them on the rock bolted base. In the event a structure location is not readily accessible by road, TEP would utilize helicopter construction techniques where feasible to install the structure. While tangent monopoles could be installed in sections by helicopter, the heavier angle and dead-end monopole structures exceed the weight capacities of even the largest helicopters. In the event that an angle or dead-end monopole structure would be needed in an inaccessible location, lattice towers would be used in place of the monopole because the lattice tower can be broken into several smaller sections light enough to helicopter to the site. Foundations for the tower could be hand dug using smaller equipment that could also be flown to the site by helicopter. When structures are brought in by helicopter, TEP could bring in equipment and personnel on a less improved road (narrower and requiring less construction disturbance to minimize steep grades and sharp turns). Note that TEP will use monopoles whenever possible. In situations where it is not possible to use monopoles, as discussed above, or where environmental impacts may be reduced due to the increased span between towers, then lattice towers would be constructed.

In accordance with ACC Decision No. 64356 (ACC 2002) requiring the use of lattice towers where their use would minimize overall environmental impacts, the primary criteria that TEP would use to identify locations for lattice towers would be whether the location is readily accessible by road. By using helicopter access to bring in structures where access by road is not available, and using lattice towers where necessary to make helicopter delivery feasible, TEP would minimize the need for new access roads or improvements to existing access roads. This would limit the area of disturbance and reduce potential impacts to a number of environmental resources (for example, soils, biological, cultural, and visual resources). In areas that are readily accessible by road, TEP would generally not use lattice towers as they disturb a larger area (see Section 2.2.2) and require increased ongoing maintenance access. TEP may use lattice towers at locations such as road crossings where their use would allow a longer span between structures. This would allow the structures to be placed farther away from the road, out of the immediate foreground for travelers on the road.

An estimated 20 to 25 structures would be brought in by helicopter for the Peck Canyon portion of the Crossover Corridor because of its topography and inaccessibility, but no structures are currently planned to be brought in by helicopter for the other alternatives (TEP 2003).

Shield Wire and Conductor Stringing. Reels of conductor and overhead shield wire would be delivered to wire-handling sites (ranging from approximately 0.5 to 1.5 acres [0.2 to 0.6 ha]) spaced about every 6 to 8 mi (10 to 13 km) along the ROW. Level locations would be selected so little or no earth moving would be required. These sites may have to be cleared of vegetation and would be disturbed by the movement of vehicles and by other activities. The conductors and shield wires would then be pulled into place from these locations. Stringing and tensioning sites and fiber-optic splicing sites would be selected to avoid environmentally sensitive resources, in coordination with land owners and managers. TEP has identified such potential sites on the Coronado National Forest in consultation with USFS (URS 2003a).

Helicopters would be used to install conductors on the support structures once in place. The process of pulling in conductors involves first pulling in small diameter ropes and placing the ropes in the stringing blocks (all done from the air), which are attached at the ends of the support arms and insulators. Once the small diameter ropes are pulled in at each conductor or phase location, the rest of the process is conducted from the ground at each end of the section to be strung. Use of helicopter for this operation would eliminate the need to cross terrain with vehicles to pull in the ropes between each structure, reducing impacts to the terrain between the pulling sites. The shield or fiber-optic ground wire would be installed in the same manner as described for the conductors.

Likewise, in the U.S.-Mexico border area, TEP expects that the transmission line would be strung by helicopter. All construction activities would be coordinated with the appropriate agencies on each side of the border. At a minimum, TEP expects the U.S. Border Patrol to be included. TEP anticipates that this effort would be coordinated with the Mexican proponent for the project and does not anticipate any ground disturbing activities within the reserved strip of land (a total of 120 ft [36.6 m]) along the international border (see Section 3.1.1, Land Use). The preliminary design of the project has the last U.S. pole on top of a hill and the first pole on the Mexico side also on top of a hill to adequately span the border (TEP 2003).

ROW Cleanup and Restoration. After construction and reclamation are complete, access to the permanent ROW would be on access roads approximately 12 ft (3.7 m) wide, in locations as specified in Sections 3.12 and 4.12, Transportation. TEP would restore access and construction areas not required for maintenance in accordance with agreements with land owners and managers. All construction areas not needed for normal maintenance would be graded to their original contour or to blend with adjacent landforms. Waste construction materials and rubbish from all construction areas would be collected, hauled away, and disposed of at approved sites, such as the Pima County Sahuarita Landfill. All areas to be revegetated would be reseeded with state-certified native seed mix to minimize erosion. Any damaged gates and fences would be repaired. To restrict access to maintenance roads, TEP would place barriers, boulders, fences, or locked gates across the maintenance roads as needed to meet the requirements of USFS, BLM, or private landowners.

Safety Program. TEP would require the transmission line contractor to prepare and conduct a safety program (subject to TEP's approval) in compliance with all applicable Federal, state, and local safety standards. The safety program would include, but not be limited to, procedures for accident prevention, use of protective equipment, medical care of injured employees, safety education, fire protection, and general health and safety of employees and the public. TEP would also establish provisions for taking appropriate actions in the event the contractor fails to comply with the approved safety program.

2.2.4 Operation and Maintenance

Use of the land in the ROW by the landowners would be permitted for any purpose that does not create a safety hazard or interfere with the rights of TEP. The day-to-day operation of the transmission line would be directed by system dispatchers in a power control center in Tucson. These dispatchers use communication facilities to operate circuit breakers that control the transfer of power through the lines. These circuit breakers also operate automatically to ensure safety in the event of a system incident such as a structure failure or a conductor failure.

An Annual Plan of Operations, that would be included as part of a USFS Special Use Permit, and a Plan of Development for BLM land, would require regular inspections for access control measures, drainage control, etc. TEP's preventative maintenance program for transmission lines would include routine aerial and ground patrols. Aerial patrols would be conducted twice a year, or upon operation of safety equipment that takes the transmission line out of service. Ground patrols would be conducted as necessary to detect equipment needing repair or replacement. Maintenance may include repairing damaged conductors and replacing damaged and broken insulators. Transmission lines are sometimes damaged by storms, floods, vandalism, or accidents and require immediate repair. Emergency repair would involve prompt movement of crews to repair damage and replace any unrepairable equipment. If access roads are damaged as a result of the transmission line repair activities, TEP would repair them as required.

Various practices would be utilized by TEP, in accordance with recommendations in this EIS, to prevent the introduction or spread of noxious weeds (invasive species which displace native species). Because of the arid nature of the proposed project area, very minor and infrequent measures would be necessary to control vegetation. TEP would not use any types of herbicides during the construction or long-term maintenance of the proposed transmission line ROW. TEP would continue their standard practice of using herbicides at substations as needed (TEP 2002b).

2.2.5 Standard Mitigation

TEP's Standard Mitigation Practices are documented in TEP's Environmental Protection Provisions application to the ACC (TEP 2001). Additional mitigation, if required, would be in agreements, permits, or ROW grants from land owners or managers (for example, in the Plan of Development agreement with BLM), in stipulations by the ACC, and in the U.S. Fish and Wildlife Service (USFWS) Biological Opinion, subsequent to ROD issuance. Table 2.2–2 presents the mitigation practices included in the proposed action.

Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action.

1. All construction vehicle movement would be restricted to the ROW, designated access, contractor-acquired access, or public roads. No widening or upgrading of existing access roads would be undertaken in the area of construction and operation, except for repairs necessary to make roads passable as specified in the Roads Analysis (URS 2003a).
2. Structures would be placed to avoid sensitive features such as riparian areas, water courses, and cultural resource sites, or to allow electric wire conductors to clearly span the features within limits of standard structure design. This would minimize the amount of disturbance to the sensitive features.
3. Construction activities would be limited to the pole construction areas, staging areas, laydown area, and access described in this EIS, with activity restricted to and confined within those limits. TEP would develop a system of colored identification flags or survey markers to identify restricted areas such as wildlife zones, archaeological sites, or ROW boundaries. TEP would arrange mandatory preconstruction seminars and training sessions to acquaint field personnel with these provisions. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.
4. In construction areas where recontouring is not required, vegetation would be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for resprouting.
5. In construction areas (e.g., construction yards, tower sites, spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur as required by the landowner or land management agency. The methods of restoration normally would consist of returning disturbed areas to their natural contour or to blend with adjacent landforms, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, or filling ditches. These instances would be reviewed on a case-by-case basis to limit access into the area and visual disturbance.
6. Watering facilities and other range improvements would be repaired or replaced, if they are damaged or destroyed by construction activities, to their condition prior to disturbance as agreed to by the parties involved.
7. Towers and/or ground wire would be marked with highly visible devices, such as colored balls or lights, if required by governmental agencies (e.g., Federal Aviation Administration, U.S. Air Force). Consultations with these agencies regarding required visual markers for each corridor are ongoing, as documented in Appendix A. It is currently anticipated that no visual markers such as colored balls or lights would be required for the proposed project.
8. Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources, including mitigation measures required by Federal, state, and local agencies. To assist in this effort, the construction contract would address (a) Federal and state laws regarding antiquities, fossils, plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.

Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action (*continued*).

9. Cultural resources would continue to be considered during post-EIS phases of project implementation. This would involve intensive surveys by TEP and/or contractors to inventory and evaluate cultural resources within the selected corridor and any appurtenant impact zones beyond the corridor, such as access roads and construction equipment yards. In consultation with appropriate land managing agencies such as USFS and BLM, and the State Historic Preservation Officer (SHPO), specific mitigation measures would be developed and implemented for National Register of Historic Places (NRHP)-eligible resources to mitigate any identified adverse impacts. These may include project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies. Native American groups, tribes, and communities would be consulted to determine whether there are effective or practical ways of addressing impacts on traditional cultural properties and archaeological sites.
10. TEP would respond to and resolve individual complaints of radio or television interference generated by the transmission line.
11. TEP would apply mitigation needed to eliminate problems of induced currents and voltages onto conductive objects sharing an ROW to the mutual satisfaction of the parties involved.
12. All construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, soils, drainage channels, and intermittent or perennial streambanks in accordance with the Coronado National Forest annual maintenance plan, BLM requirements, and all state, county, and local requirements. TEP would follow Best Management Practices (BMPs) for the construction of the entire length of the selected corridor. In addition, all construction activities would include dust-control measures. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line, in accordance with USFS or BLM.
13. All requirements of those entities having jurisdiction over air quality matters would be adhered to and any permits needed for construction activities would be obtained.
14. Fences and gates would be repaired or replaced to their original condition prior to project disturbance as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates would be installed only with the permission of the landowner or the land managing agency.
15. No non-biodegradable debris would be deposited anywhere in the project vicinity. Slash and other biodegradable debris would be left in place or disposed of in accordance with agency and/or landowner requirements.
16. If required, mitigation measures developed during the consultation period under Section 7 of the *Endangered Species Act* (ESA) would be adhered to as specified in the Biological Opinion of the USFWS. Also, TEP would adhere to mitigation developed in conjunction with state and tribal authorities.
17. Regulated materials would not be released onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be sent to a disposal facility authorized to accept these materials, such as the Pima County Sahuarita Landfill.
18. The ROW would be aligned to the extent practicable to reduce impact on the residences and inhabitants nearby.
19. Special status species or other species of concern would continue to be considered during post-EIS phases of project implementation in accordance with management policies set forth by the appropriate land managing agency. This may entail TEP conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (i.e., access and spur roads, staging areas) as agreed upon by USFS, BLM, USFWS, Arizona State Game and Fish Department, and TEP. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and may include altering the placement of roads or towers as practicable, monitoring construction activities or seasonal restrictions such as not constructing during breeding seasons. The project would be designed and constructed in accordance with raptor protection guidelines, as referenced in Section 4.3, Biological Resources.
20. The alignment of any new access roads would be designed to minimize overall impacts, including ground disturbance and visual impacts.

Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action (*continued*).

21. As smoke is a conductor of electric current, when a fire is in the vicinity of the proposed 345-kV transmission lines, firefighters would monitor for possible fire starts outside the fire perimeter. Firefighters would remain at a distance that would not leave them vulnerable to the electric current or shock.
22. Practices such as cleaning of construction equipment, to prevent the introduction of spread of invasive species, would be developed and followed in accordance with applicable requirements.

2.3 COMPARISON OF ALTERNATIVES

Table 2.3–1 presents a comparison of the alternatives based on the analysis in Chapter 4.

The resource areas evaluated for potential impacts are:

- Land use
- Recreation
- Visual resources
- Biological resources
- Cultural resources
- Socioeconomics
- Geology and soils
- Water resources
- Air quality
- Noise
- Human health and safety
- Infrastructure
- Transportation
- Minority and low-income populations (environmental justice)
- Cumulative impacts

The following discussion emphasizes the environmental implications of choosing among alternatives, organized by resource area. Where impacts are similar among the Western, Central, and Crossover Corridors, these alternatives are referred to collectively as the action alternatives (as compared to the No Action Alternative). Both temporary impacts during construction (approximately 12 to 18 months) and long-term impacts during operation of the project are considered. This discussion is followed by Table 2.3–1, which provides a more quantitative look at the differences among alternatives. In general, the No Action Alternative has the least impact on the environment as it does not involve ground disturbing activities or introduction of a transmission line into the visual landscape. Each action alternative impacts different resources in different ways, as described below.

Land Use. The Central Corridor is shorter than the Western and Crossover Corridors. The Western and Crossover Corridors each have a longer segment on the Coronado National Forest than the Central Corridor. All three corridors are identical with respect to BLM land and cross the U.S.-Mexico border in the same location.